DOCUMENT RESUME

ED 035 013 CG 004 605

AUTHOR	Pike, Lewis W.; And Others
TITLE	Prediction of Job Performance for Negro and White Medical Technicians; Development of the Instrumentation.
INSTITUTION	Civil Service Commission, Washington, D.C.; Educational Testing Service, Princeton, N.J.
SPONS AGENCY	Ford Foundation, New York, N.Y.
REPORT NO	PR-69-4
PUB DATE	Apr 69
NOTE	75p.
EDRS PRICE	EDRS Price MF-$0.50 HC-$3.85
DESCRIPTORS	Ability, Caucasians, Communication (Thought Transfer), *Job Analysis, Job Skills, Measurement Instruments, *Medical Laboratory Assistants, *Negro Employment, Negroes, *Performance Tests, Prediction, *Predictive Measurement, Racial Discrimination, Test Construction, Tests

ABSTRACT

These measurement tests were developed or selected for use in a study of job performance prediction for Negro and white medical technicians. The aptitude tests used were selected from those available rather than developed for this study. These included the Kit of Reference Tests for Cognitive Behavior, the Fine Finger Dexterity Test, and the Extended Range Vocabulary Test. The Picture Number Test and the Necessary Arithmetic Operation Test were selected for associative memory and general reasoning. Criterion measures for performance were developed for this study. A nine point scale was developed, including such points as flexibility, organization, interest, learning ability, job knowledge and communication. A job knowledge test of 584 items was also developed, and later shortened to 75 items, 63 of which were scored. A work sample was designed, taking from two to three hours maximum. A personal history questionnaire was also used, including a task information checklist. (See CG 004 689). (KJ)

ED035013

PR-69-4

PREDICTION OF JOB PERFORMANCE FOR NEGRO AND WHITE MEDICAL TECHNICIANS

Development of the Instrumentation

Lewis W. Pike

CG004 605

April 1969

EDUCATIONAL TESTING SERVICE
PRINCETON, NEW JERSEY

ED035013

Personnel

Management Committee

Albert P. Maslow, Chief, Personnel Measurement Research and Development Center, U.S. Civil Service Commission

William W. Turnbull, Executive Vice-President, Educational Testing Service

Advisory Committee

John K. Hemphill, Far West Laboratory for Educational Research and Development, Chairman

Marvin D. Dunnette, University of Minnesota

Robert M. Guion, Bowling Green State University

S. O. Roberts, Fisk University

Project Staff

From U.S. Civil Service Commission

William A. Gorham, Program Director

From Educational Testing Service

Joel T. Campbell, Senior Research Psychologist, Principal Investigator

Ronald L. Flaugher, Research Psychologist

Lewis W. Pike, Research Psychologist

Donald A. Rock, Research Psychologist

Franklin R. Evans, Associate Research Psychologist

Mrs. Lila Norris, Associate Research Psychologist

Mrs. Margaret Mahoney, Research Assistant

Mrs. Virginia Rau, Administrative Assistant

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

General Introduction to the Project[1]

Since late 1966 Educational Testing Service has been engaged in the first phase of a study entitled "Test and Job Performance of Various Subgroups Within Specified Occupations," supported financially by the Ford Foundation. The purpose of this phase of the study was to determine the feasibility of gathering, on a large scale, data relevant to the problems of test validity for minority subgroups of the population. Educational Testing Service conducted the study in cooperation with the U.S. Civil Service Commission, the personnel agency for the Federal government. In addition to securing the cooperation of Federal agencies and employees in the study, the Commission shared technical responsibility for the project.

A number of Civil Service occupations were reviewed to select one suitable for the feasibility study. The Medical Technician occupation (GS-645) was chosen because of a number of favorable technical and administrative characteristics: it had a sufficient number of Negro incumbents; the tasks which the incumbents performed appeared to have highly visible and objective outcomes which would be amenable to evaluation; and a large proportion of the entire population was employed by a single government agency, the Veterans Administration. A particular advantage of studying this occupation was that for the great majority of incumbents, test scores were not a part of the basis for hiring. As a result, there was minimal restriction of range due to selection involving test scores--an important consideration in a study of the validity of tests for job selection.

---

[1] This study was funded by the Ford Foundation and conducted jointly by the Educational Testing Service and the United States Civil Service Commission.

The present paper describes the development of the data collection instruments employed in the study, and presents the rationale for each. Later reports will present the analyses, findings, and recommendations derived from the utilization of the measures described here.

Since this project was essentially a straightforward validation study, with the added consideration of ethnic group differences, the instrumentation fell into the standard three categories typical of such studies: the predictor tests themselves, the criterion measures against which the predictor measures were to be validated, and the personal background data needed to achieve control over variables that might moderate the results of the validation attempt. After a statement of some general considerations which dictated the directions of the project, each of these three categories will be described separately.

Introduction to the Medical Technician Study

During Autumn of 1967, five ETS staff members visited a number of Veterans Administration Hospital laboratories in several parts of the country. Medical Technicians and their supervisors were interviewed and observed at work; hospital personnel officers were contacted and the personnel files were examined to determine the kinds of background variables that should be documented in the full study. Simultaneously the published literature was reviewed for any past research on this occupation. The selection and design of the actual assessment materials was then begun, and several return visits were made to hospital laboratories in order to verify or correct some impressions and to obtain further job information.

The total test package was the result of a number of considerations of content validity and feasibility. Aptitude tests were selected to represent the factors expected to correlate with success in the job of Medical Technician, according to information gained from observing the job and from interviews. One constraint on the selection of predictive measures was the feasibility of their ultimate use for personnel selection or placement. There would be little point in demonstrating, for example, that an interest measure which was administered in a research program correlated highly with job performance, if there were good reasons to expect that subjects' responses would differ substantially if they were job applicants. Other feasibility considerations, such as reasonable testing time and ease of administration influenced the selection of predictive measures, and the development of criterion and background measures as well. Criterion measures of job performance included peer ratings, supervisor ratings, and a job knowledge test. In addition, a work sample test was designed for administration in a subset of the thirty-five hospitals included in the study. Finally, a Personal History Questionnaire was designed to collect background information.

The Predictor Battery

Tests to predict success in the job of Medical Technician were selected to measure abilities identified, through interviews and work observations, as important to that job. Tests of more general abilities which might be important for predicting job success were also chosen. Among the first set of abilities were number facility, clerical speed and accuracy, certain perceptual skills, mechanical aptitude, and fine finger dexterity. The general abilities tested were verbal aptitude and short-term memory.

The aptitude measures selected

It was decided to use available tests for the feasibility study, rather than develop new ones. After considering a number of alternatives, the French, et al., Kit of Reference Tests for Cognitive Factors was chosen as the source of all the Medical Technician predictor battery subtests except one, Fine Finger Dexterity. For the latter, a test developed by the U.S. Civil Service Commission was selected. The selection of tests from the French Kit was motivated by several considerations in addition to their availability for research purposes. Each is a test as factorially pure as possible for the intended factor; their use will provide a basis for the objective comparison of factors in the present and subsequent occupational studies. They are well designed for ease of pencil-and-paper administration, with each divided into separately timed halves for reliability estimation. Previous research has shown them to be reliable and appropriate in difficulty for adults with a high school education, which typifies subjects in the present study. Finally, it is unlikely that subjects in this study have previously encountered these tests.

The aptitude tests selected are listed below, with the factor involved and the testing time. All but the sixth, "Fine Finger Dexterity," are from the French et al., Kit of Reference Tests for Cognitive Factors.

Factor and Test	Testing Time
1. Factor N: Number Facility	7 minutes
Subtraction and Multiplication Test (N-3)	
2. Factor P: Perceptual Speed	10 minutes
Number Comparison Test (P-2)	

Factor and Test (contd)	Testing Time
3. Factor Cf: Flexibility of Closure	25 minutes
Hidden Figures Test (Cf-1)	
4. Factor Cs: Speed of Closure	10 minutes
Gestalt Completion Test (Cs-1)	
5. Factor Vz: Visualization	10 minutes
Paper Folding Test (Vz-2)	
6. Fine Finger Dexterity	30 minutes
USCSC test No. 26, Pin-Dexterity Test	
7. Factor V: Verbal Comprehension	13 minutes
Extended Range Vocabulary Test (V-3)	
8. Factor Ma: Associative (Rote) Memory	18 minutes
Picture-Number Test (Ma-1)	
9. Factor R: General Reasoning	10 minutes
Necessary Arithmetic Operations Test (R-4)	

Bases for selecting the aptitude measures

Because basic arithmetic computations are a routine part of every Medical Technician's job, a "Number Facility" test such as Subtraction and Multiplication was clearly indicated. The accurate performance of clerical tasks under time pressure also typifies the work of the technician. Even in highly automated medical laboratories, the task of keeping specimens properly matched to patients throughout complex laboratory procedures, of recording results accurately, and of keeping track of a myriad of supplies is formidable, and accuracy is essential. To test this clerical ability, the Number Comparison Test was chosen.

Particularly in laboratory work using the microscope, Medical Technicians must be able both to recognize anticipated configurations (such as the various types of white blood cell) embedded in a complex field, and to identify unanticipated forms in a situation of reduced cues. The first ability was tested by the Hidden Figures Test, which provides an index of "Flexibility of Closure," and measures the ability to identify known configurations when they are presented with perceptual distractions. The test has further potential in the present study, in that it has been found to correlate with "field independence - field dependence" (Witkin, et al., 1962), a dimension of cognitive style which may be of interest when examining ethnic differences in job performance and job ratings. The Gestalt Completion Test was selected to test the second ability. In this test, the subject must organize an apparently disparate field into a single percept; in contrast to the preceding task, he does not know what he is looking for. For example, he must recognize a pictured object as a flag, although parts of the picture are missing.

Although Medical Technicians and their supervisors did not suggest that mechanical ability was important, it was clear from observing technicians on the job that those who were effective had a good working knowledge of the numerous instruments and devices used in the laboratory, and that such knowledge was necessary for properly setting up, calibrating, adjusting and maintaining this equipment. The "Visualization" factor measured by the Paper Folding Test was therefore included in the aptitude measures, because it has been found to be important to Mechanical Movement and Mechanical Comprehension tests.

The final aptitude test selected on the basis of job observations and interviews was the Fine Finger Dexterity Test, which has been developed and used by the U.S. Civil Service Commission. The test has content validity, in that much of the Medical Technician's work requires skilled hand manipulation of instruments and materials, under considerable time pressures. In taking this test, subjects are required to transfer a pattern of printed dots to a small card by making pin punches, and then to transfer the punched pattern to a standard answer sheet. The pin-punching portion of the test is highly speeded.

The remaining aptitude tests involve general abilities that might or might not be important in satisfactory performance as a Medical Technician. Their inclusion was motivated in part by their very generality, and in part by the wish to test their reputations as being either comparatively fair or comparatively unfair to Negroes and other minority persons.

"Verbal Comprehension" is a factor related to success in a wide range of jobs, but tests of this factor are commonly accused of being biased against minority groups. The inclusion of a test of verbal ability allowed a determination of its relationship to success as a Medical Technician and a check on whether such a test was indeed unfair to Negroes. A stable, pure measure of this factor is readily available through vocabulary tests. Because the technicians interviewed seemed to vary considerably in verbal ability, the Extended-Range Vocabulary Test was selected.

Other factors which should probably be included in any exploratory predictive battery because of their generality are "Associative (Short-Term) Memory" and "General Reasoning." To test these factors, the Picture-Number Test and the Necessary Arithmetic Operations Test were selected.

The Criterion Measures

The success of any validity study depends largely upon the degree to which satisfactory criteria can be obtained, that can be agreed upon as legitimate measures of performance quality. Any single criterion measure, however, can only be an estimate of actual performance and is open to some particular source of error. With this in mind, several criteria were used in this study, and fully as much effort was expended on the criterion aspect of the study as on the selection of the aptitude tests and the development of the background questionnaire combined. Rating scales for both supervisory and peer use, a test of job knowledge, and a work sample were all used as criterion measures. These will be discussed in turn.

The Rating Scales[1]

In developing scales for rating job performance, the first step was to draw up a list of specific tasks and responsibilities of Medical Technicians, and the abilities needed to carry these out. The list was based on observations and interviews of laboratory personnel at VA Hospitals. Additional field visits were then made to check the representativeness and inclusiveness of the list. With the help of two medical laboratory supervisors, the professional staff at Educational Testing Service then grouped the items in the list into thirteen clusters, each forming the basis for a potential rating scale. Following a third round of observations and interviews, some items were regrouped, and eight clusters or scales emerged. These, plus an "Overall" scale, became the nine rating scales used in the study.

At this point, a brief description was written for each scale, and a paragraph describing the performance of a fictitious person on that dimension was provided. Each rater was to rate this person along with his actual ratees,

thus providing the opportunity to control across raters for differential preferences in rating behavior.

The scales which finally emerged may be described in a very general way with the following titles:

1. Flexibility, Adaptability to Change
2. Organization, Planning Ability
3. Interest, Initiative
4. Learning Ability
5. Job Knowledge
6. Technique, Coordination
7. Low Need for Supervision
8. Communication
9. Overall

The rating scales were not identified in the booklets by descriptive terms such as "Flexibility" or "Planning Ability." Rather, each was identified simply as "Scale 1," "Scale 2," and so on. The anchored rating scale technique was used. At the top of the page on which a given scale appeared, a brief description was given of the ability or characteristic to be appraised. Centered beneath this was a vertical line, marked off in nine intervals. General descriptions of three levels of performance were given on the left side of the line or scale, and specific examples of expected behavior representing each of these levels were given on the right. Accompanying each scale on the facing page was a description of the behavior of the fictitious person. The rater was given the list of persons whom he was to rate, and was instructed to indicate on each of the nine scales his rating of each of these persons, and of the fictitious constant ratee, by putting the number identifying the person on a point along the scale corresponding to the ratee's

performance level. An example of the rating instrument appears as Appendix A of this report.

The Job Knowledge Test

Another criterion measure administered to all subjects was a test of job knowledge. In a survey of likely sources, no appropriate test was found which could be administered to the incumbent Medical Technicians. Through informal contacts, however, it was discovered that one medical laboratory training school had developed a large number of test items over a period of years, from which it was likely that a sufficient number of items appropriate for our purpose could be obtained. A total of 584 items was very generously made available to us from the Allegheny General Hospital Medical Laboratory Assistant Training Program in Pittsburgh, Pennsylvania. After reviews by two supervisors of medical technicians, one from a VA hospital and the other from a civilian hospital in the Princeton, New Jersey area, 147 items were selected as those most likely to differentiate among technicians on the dimension of job knowledge. These test items were assembled and pretested on a total of 26 technicians at two VA hospitals. From timing information gained in these test administrations, it was estimated that 90 per cent of the technicians could complete about 60 to 65 items in the one-half hour allotted to this measure. The goal of 90 per cent completion was selected to minimize the effect of speededness on the test score. A seventy-five item test was then assembled, with only the first sixty-three items to be scored. The remaining twelve were included as a "filler" to occupy those technicians who completed the test most quickly. The content of the items was balanced to represent as fairly as possible the various specialties within the laboratories, and those items

passed by between fifty and sixty per cent of the technicians participating in the pretesting were chosen whenever possible.

The Work Sample[2]

A work sample is a persuasive sort of criterion measure in that it supposedly provides a measure closely related to actual job performance. This basis of appeal may be deceptive, however, because there are substantial problems of validity and reliability to be considered. In many instances, a work sample must be individually administered, and it typically consumes a great deal of time for a relatively small return in the quantity of data obtained. Given the usual constraints on the amount of available testing time, then, getting an adequate sampling of "items" becomes a major problem. It follows, of course, that reliability is more difficult to achieve. A particular problem in developing an appropriate work sample for this study was that medical laboratory work is generally divided into six specialties, with a cluster of duties and tasks unique to each. Although the VA emphasizes technicians' being familiar with more than one specialty, this goal is only partially realized. In most VA hospitals studied, the majority of technicians tended to have developed more skills in one area than in another. This was particularly true of the larger hospitals, where it was less important that each technician be able to perform as wide a range of laboratory duties as possible. Another problem was that a wide array of tasks make up technicians' work within any given specialty, making a representative sampling extremely difficult. Finally, reliability was further reduced by the large number of uncontrolled sources of variance. These included, for example, such laboratory-specific factors as type and number of lab tests routinely performed by each incumbent, staff

rotation, type and condition of equipment, and favored procedures and techniques.

In developing the work sample, the following guidelines were employed:

(1) Limit maximum testing time to 2-3 hours.

(2) Use standardized specimens having known values, against which to evaluate laboratory test results.

(3) Select laboratory tests that tap a variety of task components, and are relevant for technicians in most specialties.

(4) Minimize variance due to between-laboratory differences such as available equipment and favored procedures.

After extensive consultation with medical laboratory personnel in both VA and civilian hospitals, and with representatives of pharmaceutical companies engaged in providing quality control materials and services to the laboratories, two tasks were selected as best meeting the above criteria. One task was to do routine differential cell counts, using two previously prepared slides. The other was to complete an alkaline phosphatase test. The routine differential is a hematology task, familiar to most laboratory technicians regardless of specialty. It is one of the most common laboratory tests. Involved are the use of a microscope, accuracy and technique of counting, the ability to differentiate among cell types, and technical knowledge necessary to recognize particular blood cell anomalies.

The alkaline phosphatase test is performed in the general chemistry section of hospital laboratories. It involves following complex, detailed procedures, and using a relatively sophisticated unit of equipment, the spectro-photometer. Procedures involving the spectro-photometer are in general more complex, and familiar to fewer technicians, than procedures

involved in the differential counts. Component skills include pipetting, manipulation of test tubes and cuvets, mixing reagents, constructing and reading values from graphs, and accurate timing of intervals. To put technicians on a more equal footing, a new alkaline-phosphatase procedure, unknown to most technicians, was used in the work sample. Four pages of detailed instructions were provided (see Appendix B). Necessary reagents and standards were also provided, eliminating those sources of variation. Three independent measures of competence were obtained. One was the accuracy of the technician's calibration curve, plotted from standards of known value. The other two were based on his accuracy in obtaining readings for various concentrations of unknown serums A and B. The procedures, reagents, and standard serum samples, along with considerable time and advice, were provided by Warner-Chilcott Laboratories of Morris Plans, New Jersey.

Background Information Measure[3]

Preparation of a "Personal History Questionnaire" began with the interviews of incumbent technicians and their supervisors, and a review of personnel records in a number of VA hospitals, to determine what kinds of background information would be most likely to be related to success in the Medical Technician occupation. The form and content of the background questionnaire were also influenced by a survey of Civil Service Personnel Research Questionnaires, the Student Information Blank from project TALENT (Flanagan, 1964), Glennon and Albright's Catalog of Life History Items (1966), and similar sources. An example of the Personal History Questionnaire appears in Appendix C of this report.

The standard questions of age, sex, and birthplace were included in the questionnaire. Emphasis was given to questions regarding socioeconomic status,

general and special education, and military and other government experience. Several aspects of work history were covered. Among these were U.S. Civil Service grade (GS level) at entry into the occupation, and the comparative roles of experience and formal training as determiners of the individual's grade achieved and the time taken to achieve it. Also in this category were questions of why the incumbent chose his occupation, and what has motivated him to remain in it. Incumbents were asked about their specialization within Medical Technology, and the amount of experience and training they have had for each of the several specialties. Questions were asked about continuing education, both formal and informal, whether received on or off the job. The questionnaire was deliberately over-inclusive, to reduce the likelihood of overlooking background variables which might prove relevant in predicting job success.

A task information checklist was added as a supplement to the questionnaire. Items for the checklist were selected from those developed in a study conducted by Morsh and Christal at the Air Force Personnel Research Laboratory (1966). They had evaluated the job of Medical Technician and in a factor analysis found factors corresponding closely with laboratory section or specialty. In the present study, subjects were instructed to check, after each task, the frequency with which they performed that task. A four-point scale was provided, ranging from "Often" to "Never." One purpose of the checklist was to provide an indication of whether there might be systematic differences in the tasks performed by persons of different ethnic groups within given GS-levels and specialties. In general, it gave a systematic check on our perception of what laboratory personnel in various subgroupings actually do.

References

Flanagan, J.C., The American High-School Student: Project TALENT. U.S. Office of Education Cooperative Research Project No. 635. Pittsburgh: University of Pittsburgh, 1964.

French, J.W., Ekstrom, R.B., and Price, L.A. Kit of reference tests for cognitive factors. Princeton, New Jersey: Educational Testing Service, 1963.

Glennon, J.R., and Albright, L.E. A Catalog of Life History Items. Washington, D.C.: Scientific Affairs Committee, American Psychological Association, Division 14, 1966.

Morsh, J.E., and Christal, R.E. Impact of the computer on job analysis in the United States Air Force. PRL-TR-66-19, AD-656 304. Lackland AFB, Tex.: Personnel Research Laboratory, Aerospace Medical Division, October, 1966.

Witkin, H.A., Dyk, R.B., Faterson, H.F., Goodenough, D.R., and Karp, S.A. Psychological Differentiation. New York: Wiley, 1962.

Footnotes

[1]Mrs. Lila Norris held primary responsibility for the development of the rating scales.

[2]Mrs. Lila Norris held primary responsibility for the development of the work sample.

[3]Mrs. Margaret Mahoney held primary responsibility for the development of the background information measure.

PR-69-4

Appendix A

JOB PERFORMANCE APPRAISAL FORM
FOR
MEDICAL-TECHNICAL PERSONNEL

Prepared by
EDUCATIONAL TESTING SERVICE
(Experimental edition-for research purposes only)

Copyright © 1967 by Educational Testing Service. All rights reserved.

As you know, we are giving tests to laboratory personnel, but paper-and-pencil tests measure only certain aptitudes and abilities in relation to jobs. Our research project is interested in doing something about this. Before we can decide how good the tests are, we must find out how well each person is performing on the job. With experienced workers, actual job performance is the best indication of their effectiveness. We want to find out what test abilities are related to this job performance. We need your help in appraising each person's job performance in order to "test the test." Therefore, we are asking you to rate laboratory personnel on the rating scales in this booklet.

When you have finished the ratings, please place this booklet in an envelope and seal it. The envelope will not be opened again until it arrives at the Educational Testing Service, Princeton, New Jersey. After the information has been used in the research, it will be destroyed. Your ratings will not affect the job of any person, and will not be recorded officially or unofficially. In fact, they will be seen by no one other than the ETS research staff, so please be as frank as you can. If you are, this study will be worthwhile.

How to Use the Rating Scales

You are asked to appraise the medical-technical personnel in your laboratory on each of nine important aspects of job performance. In addition, you are to appraise the performance of a fictitious individual (named "Otto Analyzer" in an attempt to add a bit of humor to the task) on Scales 2 through 8. Your appraisal of Mr. Analyzer is to be based on the descriptive material about him in the boxed paragraph on the page opposite each scale. The purpose of this is to get a better reference point so that we can more scientifically merge the ratings of many people in many laboratories in many sections of the country.

Before recording your appraisals, carefully read the description of what is to be rated and the statements on both sides of the scale line. For Scales 1 through 8, there are three sets of paired statements. The two statements beside one another try to describe the same level of job performance. As you see, we have tried to describe three of these levels, using two sets of statements for each. For Scale 9, the five unpaired statements represent five different levels of overall performance. Using the statements for each scale as a guide, take some time to consider where each of the people you are rating best fits along the total scale (top is effective performance, bottom is less effective). Try to avoid the tendency to rate everyone high or low, or to rate one person at the same point on every scale. Think about each person's strong points, and, if he has them, weak points.

We have listed on the bottom of the form each of the people you are to appraise. Do not rate yourself, but do rate Otto Analyzer on Scales 2 through 8. If you do not know some of the people

listed, you should not rate them. We have assigned a number to each person--including Otto, whose number is 1. Use only these numbers when making your appraisals.

How to record your appraisal: To make your appraisal of a person's job performance, first read the description of that aspect of job performance at the top of the page and the three scale points that have been described. Next mark an "X" through the place on the scale that, in your best judgment describes the individual's typical performance on that quality. Then write that person's number to the left of the "X". You may use the whole scale, not just the three points that have been described. That is, if you feel that a person falls somewhere in between two of the defined points, put the X and his number where you think he is.

For an example, turn to Scale 1, where we have already rated Otto Analyzer. Read the description of this aspect of performance at the top of the page. Then read the description in the box on the page opposite Scale 1, then look at Scale 1 again. Notice that we have placed an X and the number 1 rather low on the scale. Our appraisal of Otto's performance (with which you may or may not agree) was based only on the information in the boxed paragraph on the page opposite Scale 1. Now mark an X on the line at the place you think best describes person 2 on your list. Then put a 2 to the left of that X. Continue rating the rest of the people on the list (except yourself), being sure to put their numbers beside the X's. When you have finished with this scale, check to be sure you have an X with the appropriate number to the left of it for each person you are rating. Now turn to Scale 2. After you have read the description of what is to be rated, read the description of Otto to the left and rate him. Then rate the rest of the people on this scale. Follow this same procedure for all remaining scales.

Some people ask us if they can rate one person on all the scales and then rate another person, etc. We have found in the past that you will do a better job and give us more meaningful information if you complete each scale for everyone before going on to the next one. At the end, if you wish, you may go back through the entire form to recheck your appraisals, and make any adjustments you feel are required to express your judgment more accurately.

If you have any questions, please ask the research person who is overseeing this program. If such a person is not available, make the ratings as well as you can, but someplace on the form write down what you did not understand so we can take this into account.

REMEMBER, THIS INFORMATION IS STRICTLY CONFIDENTIAL AND IS TO BE USED FOR RESEARCH PURPOSES ONLY.

Thank you for your cooperation.

Otto Analyzer's specialty is hematology and though he has upon occasion worked in several of the other departments he prefers to work in the hematology laboratory. Most of the people have assignments on a rotating basis. But Otto does not. When Otto was asked if he would take on a rotating assignment, he agreed to give it a try. While his work in the other sections of the laboratory was satisfactory, it was apparent that he was not happy with this arrangement.

Scale 1

Some people can change from task to task more easily than others without getting ruffled. They can handle a wide variety of tasks and can be counted on in an emergency. At the other extreme are those people who find it more difficult to change from one task to another. These people work well only when work proceeds in a highly routine or repetitive manner. When making this rating, appraise the ability of the individual to adapt to changing situations encountered in the laboratory.

Can readily adapt to new procedures and equipment. Capable of changing jobs suddenly and with efficiency. Can handle a crisis smoothly.

This person can handle a wide variety of tests. He remains calm even under unusual time and work pressures. He is highly confident while conducting tests.

Able to change from one task to another and handle a reasonable number of tasks at the same time. Might show the strain of a crisis but usually able to get the work done.

This person works best when procedures and work load are routine, but can adapt to changes or crises as required.

1 X

Unwilling to accept changes in procedures or equipment. Unable to adapt to unusual work situations.

This person grumbles about a change in routine. He is very likely to be helpless in a crisis.

Otto Analyzer usually comes to work early so that he can get things set up for the day's work. He's been at this hospital long enough so that he knows what the typical work load is and he is able to schedule his assigned work. If there are no emergencies during the day he is usually finished with his work an hour or so before quitting time.

Use this information as a basis for rating Otto Analyzer on Scale 2

Scale 2

Some people plan their day's work very efficiently, and seem to "think ahead" in their work. Other people seem to need help all the time in getting organized and in planning their work. In this rating, appraise each person only on the basis of his planning efficiency; disregard other aspects of the work.

Plans out his work and appropriately assigns priorities. Anticipates and plans for unusual situations.

This person will have planned ahead when others have not. He will have ordered new supplies (blood, reagents, etc.) well in advance of needs.

Plans for most of the work, but is limited in ability to anticipate and provide for less obvious needs and emergencies.

This person plans out his assigned work load. He usually begins tests first that take the longest time to complete so that he can do the shorter ones in the interim.

Cannot judge priorities well. Needs assistance in planning work schedule.

This person usually wastes time doing some unnecessary job and must have constant supervision to perform tasks. He might allow his department to run out of supplies or solutions.

Otto Analyzer has a certain zest and sparkle and does just about everything with great enthusiasm. Sometimes, however, his enthusiasm gets the better of him. For instance, the other morning he got an unusual test result, and he proceeded to check it out on his own. He spent the entire morning working on the specimen and even left the laboratory to go to the hospital library. Toward the end of the day, however, it became evident that Otto would not be able to complete the required work, and one of the other people in the laboratory had to come in and give him a hand.

Use this information as a basis for rating Otto Analyzer on Scale 3

Scale 3

Some people show a great deal of interest in their work and voluntarily try to improve their own work as well as the overall work in the laboratory. Others, regardless of how well they can do the work, don't seem to care and need a lot of prodding by the supervisor. When making this rating, appraise the interest and initiative which is demonstrated on the job and disregard the actual quality of the work appraised.

Enjoys his work. Voluntarily takes steps to accomplish tasks without being asked by his supervisor. Shows some originality.

This person frequently remains or comes back after hours. He makes useful suggestions for improving the work in the laboratory. He looks for work in other departments when his own work is completed. He takes advantage of all opportunities to improve his knowledge and skill (e.g., does outside reading).

Shows some interest in the work. Occasionally requires some encouragement from his supervisor. Does what is expected of him for the position he holds.

This person usually "lends a hand" when he is needed. He sometimes looks for additional work but sometimes does not.

Seldom shows any interest in his work. Gives the impression that he would rather be somewhere else. Requires frequent direction by his supervisor and finds it difficult to work on his own.

This person does what he is told and no more. He sometimes neglects his duties and seldom shows interest in his work. He is usually the first one out of the lab at quitting time.

Otto is not very quick to learn new procedures but he is able to profit from instruction. It takes him a while before he is able to master a new procedure but he is willing to spend his time and effort learning from others in the laboratory.

Use this information as a basis for rating Otto Analyzer on Scale 4

Scale 4

Some people can "catch on" to things very quickly, while others seem unable to learn from explanations or from practice. When making this rating, disregard the individual's experience and technical knowledge and appraise him solely on the basis of his willingness and ability to learn on the job.

Learns new procedures easily and seems very quick to understand and comply with new procedures.

This person is the first to learn a new procedure. He needs a minimum amount of instruction. For example, he might be the one selected by the supervisor to receive special instructions on the use of new equipment.

After a little instruction, will perform tasks efficiently and with understanding.

This person requires some help and practice in order to master new procedures.

Seems very slow to understand. Must constantly be shown how to do procedures that should be very familiar by now.

This person has difficulty learning new procedures. He needs a lot of help and practice if he is to perform a new test. The range of tasks he can do without help is limited.

Otto has been at this hospital laboratory for almost 10 years and is familiar with just about every aspect of the routine work. He can perform all of the routine tests and can usually recognize unusual test results. But he has not kept up with some of the new procedures and is therefore somewhat limited in the work he can do.

Use this information as a basis for rating Otto Analyzer on Scale 5

Scale 5

Medical laboratory people must know a great deal about the details of their tasks, but some seem to know more, and understand more of the theory than others. On the other end of this scale are people who do not seem to understand even what is "common knowledge" about their job. Appraise the individual's technical knowledge; disregard other aspects of his work.

Has an unusual comprehension of procedures involved in this work, and in addition, has a good understanding of the scientific principles behind them.

This person has a great deal of technical knowledge and others in the lab come to him with their technical questions.

Possesses essential technical information but may be deficient in knowledge of basic principles.

This person is able to recognize unusual test results but he might not know the meaning of such results. He has an adequate familiarity with the instruments and with the tests to be performed.

No real understanding of why tests are performed. Very spotty technical knowledge, or knowledge restricted to only the most common technical information.

This person performs tests purely by rote. He asks questions about things that are common knowledge.

Otto's work bench is usually a mess, and he sometimes has to be reminded to do a clean-up job. It isn't as if he doesn't try, it's just that he has never gotten the hang of some of the basic laboratory techniques. He has had several accidents in the laboratory this year but has not lost any time from work. He is a very conscientious worker, though.

Use this information as a basis for rating Otto Analyzer on Scale 6

Scale 6

Some people work smoothly and quickly, and are very skillful in their laboratory "technique" and in handling equipment. Others seem to be more clumsy or slow and tend to have difficulty performing tasks that require a high level of precision or coordination. In this rating, appraise the individual's technique in conducting tests and handling equipment.

Highly efficient in the use of equipment, materials and specimens. Good "technique" in the laboratory. High degree of accuracy in carrying out complex tasks.

This person would be called on first to perform tasks requiring accuracy as well as speed. He can be trusted with the most complex and expensive laboratory equipment.

An average "technique" in the lab. Performs tasks adequately.

This person usually reaches accurate conclusions within a reasonable time. May ruin a specimen or two, but this is rare. Successfully uses equipment necessary for his work.

Poor technique in the laboratory. Some tests may be improperly performed.

This person frequently spills liquids or breaks glassware. He is rather clumsy in the laboratory and is limited in his use of equipment. He may occasionally contaminate a specimen because of poor technique.

Otto generally comes to work on time and has not been known to abuse his sick leave allowance. He does everything he is told to do and informs the supervisor of any irregularities or unusual test results.

Use this information as a basis for rating Otto Analyzer on Scale 7

Scale 7

Some people need very little supervision. They follow directions closely and can be counted on to make sound decisions about their work. Others rarely demonstrate sound judgment and require constant supervision. When making this rating, appraise the degree of responsibility demonstrated by the individual on the job.

Can see what tasks need to be done and takes initiative in doing them without need of direction from supervisory personnel.

This person is a potential supervisor. I would expect him to act as a stand-in for the supervisor if necessary.

Follows directions closely. Brings unusual test results to the attention of the supervisor. Rechecks unrealistic results.

This person generally comes to work on time and complies with the rules and regulations of the laboratory. If something looks wrong, or if he isn't sure, will ask somebody to help him out.

Rarely makes sound decisions and his work must be structured so as to eliminate the necessity for decision-making.

This person sometimes overlooks indications that tests are not being completed properly. He can do the work but requires frequent spot supervision.

Otto enjoys talking to people but sometimes has difficulty expressing what he wants to say in general conversation. He knows the technical laboratory vocabulary, however, and speaks well enough so that he can communicate laboratory information to others.

Use this information as a basis for rating Otto Analyzer on Scale 8

Scale 8

Laboratory people have to talk to one another and with others in the hospital in order to get their work done. They have to know lab "jargon". Some people communicate better than others. Rate the individual's ability to communicate with others; disregard all other aspects of the job.

Expresses things clearly and accurately. He is understood well and knows the lab "jargon."

This person speaks very well. He has a large technical vocabulary and has no difficulty expressing himself.

Has an adequate command of the language.

This person usually expresses himself adequately.

Has some difficulty expressing himself orally in a way that others can easily understand.

This person often gropes for words and has difficulty communicating with others about the work in the laboratory.

DO NOT RATE OTTO ANALYZER ON SCALE 9

Scale 9

So far you have been asked to appraise only some of the qualities that make a person an effective worker. In this last scale we would like you to think of the total job a person is doing and make an "overall" rating. Assume that there has been an order for a reduction in the size of the staff. Which one do you feel should be released first? On the basis of overall performance on the job, which one would be the last person you would want to see go? When making this rating, try to spread the people out along the scale as much as possible.

This is the most valuable person in the laboratory. He is an outstanding worker. This person would be missed most if he were to fall ill or change jobs.

This is a very valuable person and his overall performance is above that of the average worker.

This person is about an average worker. We can certainly use people like him in the laboratory. If he were to leave, however, he could probably be replaced without too much trouble.

This person's work is somewhat poorer than average. If the size of the staff had to be reduced, he should be among the first to go.

This person barely meets the minimum requirements for the job. In a staff reduction, he should be the first to go.

FINAL INSTRUCTIONS

1. Check all the scales to make sure that each X has a number next to it.

2. Place this booklet in the envelope that has been provided.

3. Seal the envelope and write your name on the front of it.

Assigned Number	NAME OF PERSON RATED
1	Otto Analyzer
2	
3	
4	
5	

Assigned Number	NAME OF PERSON RATED
6	
7	
8	
9	
10	

PR-69-4

Appendix B

PRACTICAL EXAM
ALKALINE PHOSPHATASE
AND
DIFFERENTIAL COUNT

Name _____
VA Station _____
Date _____

Time started _____
completed _____

Total testing time _____

PRACTICAL EXAM

You are being asked to perform two types of tests - a differential count and an alkaline phosphatase. All the necessary equipment, reagents, and directions have been provided.

The tests can be done in whatever order you like, but plan to work as efficiently as possible. Before proceding with the actual testing, take time to read all the directions carefully. If you have any questions, refer them to the person overseeing this research program.

The results from these tests will be kept strictly confidential and used for research purposes only. When you have completed your testing, put your recorded test readings into the envelope provided and then seal the envelope.

Thank you for your cooperation.

DIFFERENTIAL COUNT

You have been provided with two stained smears (stained with Wright's stain) obtained from peripheral blood. Do differential counts on both slides - labeled 1A and 1B. Record your results on the forms provided.

ALKALINE PHOSPHATASE

GENERAL INSTRUCTIONS:

1. Be sure the water bath is at 37.5°C before starting.
2. Read each section completely before starting.
3. Follow directions exactly.
4. Record all data in spaces provided.

STANDARDIZATION

Check to see that you have the following reagents and equipment:

1. Test Tubes, Capacity 10-15 ml. (4)
2. Volumetric Flask, 50 ml. (1)
3. Volumetric pipet, 1.0 ml. (1)
4. Serological pipets, 5 ml. and 1 ml. (latter pipet calibrated in 0.01 ml.) (2) and (1)
5. Cuvets, 10 or 12 mm. light path. (7)
6. Semi-log, single cycle graph paper (2 sheets)
7. Ampul of stock Phenolphthalein Standard (0.796 mg/ml. equivalent to 2.5 uM/ml.)
8. Color stabilizer (dissolved according to package directions).
9. Interval timer and stopwatch
10. Erlen Meyer Flask, 50 ml. (1)
11. Transparent ruler
12. Ampul file

A. Prepare working Phenolphthalein Standard (0.05 uM/ml.):

1. Break neck of stock standard ampul and transfer contents into an empty test tube. Label it stock standard. Transfer 1.0 ml. of the contents to the 50ml. Volumetric Flask.
2. Dilute to the mark with distilled water, MIX.
3. Transfer approximately ½ of the contents into the Erlen Meyer Flask.

B. Color Development:

1. Number four test tubes 1, 2, 3, 4.
2. Using separate 5 ml. Serological pipets, one for the stock standard and one for the stabilizer, proceed as follows:

Tube No.	Stock Standard	Color Stabilizer
1	1.0 ml.	5.0 ml.
2	2.0 ml.	4.0 ml.
3	3.0 ml.	3.0 ml.
4	4.0 ml.	2.0 ml.

3. Using a 1 ml. Serological pipet, add 0.14 ml. of color stabilizer to each tube. Mix by inverting each tube.

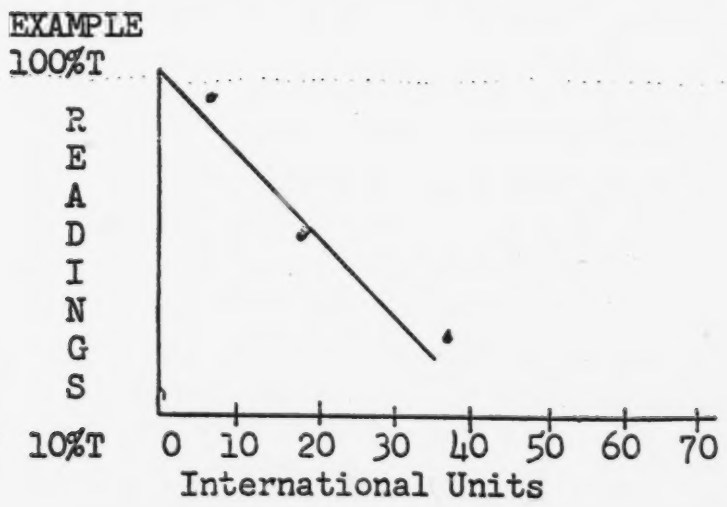
*If the photometer is in use, start the assay of serum specimens (top of page 3) and return to this step later. These readings can be taken when the photometer is not in use.

4. Adjust the photometer wavelength knob to 550 nm: place a cuvet containing Color Developer (approximately 3/4 full) in the cuvet well; set the galvanometer needle to 100% transmission with the coarse and fine adjustment knobs; transfer contents of standard tubes to cuvets and record their respective reading below.

Tube No.	%T	Value Represented
1		25 International units
2		50 International units
3		75 International units
4		100 International units

C. Preparation of Curve

1. Using the semi-log paper provided you, fill out the information block in the lower right hand corner.
2. Let each vertical line represent one International Unit and number by tens across the bottom of the paper.
3. Draw your calibration curve by plotting the points of your observed %T readings (using the left-hand or vertical axis) against their respective International Unit values (using the bottom or horizontal axis). Draw a STRAIGHT line, starting at the upper left hand corner (100%T), which comes closest to intersecting each plotted point. The line must originate at the 100%T point.



TESTING

ASSAY OF SERUM SPECIMENS:

Check to see that you have the following reagents and equipment:

1. Test tubes and cuvets, same as in Standardization procedure.
2. Pipets, Serological 5 ml. and 0.1 ml.
3. Substrate, Alkaline Phosphastrate TM
4. Color Stabilizer, same as in Standardization procedure.
5. Distilled water.
6. Two serum specimens, one labeled "A", the other labeled "B".

A. Color Development

1. READ ENTIRE PROEDURE FIRST!
2. Label test tubes A-1, A-2, A-3, B-1, B-2, B-3, Blank.
3. Place tubes in rack and proceed as follows (do not place rack in water bath until Step #3).

PIPET TO USE	STEP	REAGENT	Test Tubes A_1 A_2 A_3	B_1 B_2 B_3	Blank
None	1	Substrate	1 drop in each of the 7 tubes		
5 ml.	2	Dist. Water	1 ml. in each of the 7 tubes		
	3	Place entire rack in water bath for 5 minutes			
0.1 ml.	4*	Serum "A"	0.1 ml. in each tube. Mix	X	X
		Serum "B"	X	0.1ml. in each tube. Mix	X
		Dist. Water	X	X	0.1 ml. in each tube. Mix
	5	Allow to incubate until twenty minutes have passed since adding the first 0.1 ml. serum to its test tube.			
5 ml.	6**	Color Stabilizer	5 ml. in each of the 7 tubes		

* As soon as you add 0.1 ml. of Serum "A" to test tube A-1, activate an interval timer set at 20 minutes. Add each successive 0.1 ml. of serum to its respective tube (and distilled water to the Blank tube) at 30 second intervals. A total of three minutes will have elapsed by the time you add water to the blank tube.

** Maintain the 30 second time intervals here as well. Mix each tube, by inverting twice as soon as you add 5 ml. of color stabilizer to it. When this has been done, time intervals are no longer important as the color is now effectively stabilized for an hour.

B. Reading Colors and Determining Values:

1. Determine the %T Transmissions of tubes A-1 thru B-3 exactly as in the Standardization procedure, EXCEPT the galvanometer is adjusted to 100%T with the tube labeled BLANK.

2. Record your readings below and determine the Alkaline Phosphatase activity of each tube by locating its %T on the left hand axis of the calibrated graph paper; projecting across the graph until you intersect the calibration line; and projecting down to the horizontal axis to read the corresponding Units of Activity.

Tube No.	%T	Activity
A_1		_____ International Units
A_2		_____ International Units
A_3		_____ International Units
B_1		_____ International Units
B_2		_____ International Units
B_3		_____ International Units

PR-69-4

Appendix C

PERSONAL HISTORY QUESTIONNAIRE

Prepared by
EDUCATIONAL TESTING SERVICE

(Experimental edition - for research purposes only)

Copyright© 1967 by Educational Testing Service. All rights reserved.

No. _____

PERSONAL HISTORY QUESTIONNAIRE

We are interested in understanding various aspects of success in certain kinds of medical laboratory positions. Therefore, we are asking you to help by providing information about your personal history. In this questionnaire, you are asked to give us this information, usually by marking the one alternative out of several which most nearly describes you.

When you are filling out this questionnaire please bear these points in mind:

(1) There are no "right" or "wrong" answers. Please be frank and mark those which best express <u>your</u> background and experience.

(2) Because this is a research study, the information will be treated <u>confidentially</u> and will <u>not</u> be a part of your personnel record. Specific answers given by specific individuals <u>will not</u> be made known to your supervisors. Only overall results of this research will be made known to any official of the government.

(3) Because some of the information we are requesting is personal, you may omit any particular question(s). We hope that you will answer all the questions, but you do have the option to leave any particular question unanswered.

(4) This questionnaire has the same identifying number as will appear on the tests and other materials you are given. This identification is used to aid in the examination of relationships among the questionnaire items, the tests you will take, and ratings on your performance in the medical laboratory.

(5) There is no time limit. Please work rapidly, but carefully.

With your assistance, this study will result in our gaining a great deal of valuable information which we hope to use in improving the effectiveness of the selection of laboratory personnel.

Thank you.

Research Staff
Educational Testing Service

PERSONAL HISTORY QUESTIONNAIRE

GS Level _____

Title _____

VA Station _____

On the following pages you will find a number of questions concerning your personal background. Please try to answer them as accurately and completely as you are able.

In most cases, you are to record your answers by making check marks in the squares on the right-hand side of each page. Please mark only one answer for each question unless you are instructed otherwise.

For some of the questions, you are asked to write the information requested in the blank spaces provided. Please read each question carefully, so that you will know what you are expected to do.

Remember, there are no "right" or "wrong" answers. Your responses will be kept strictly confidential.

Thank you for your cooperation.

A. GENERAL BACKGROUND:

1. What is your sex?

	Check one:
1. Male	1. ☐
2. Female	2. ☐

2. What is your age?

	Check one:
1. less than 20 years	1. ☐
2. 20 to 29 years	2. ☐
3. 30 to 39 years	3. ☐
4. 40 to 49 years	4. ☐
5. 50 to 59 years	5. ☐
6. 60 years of older	6. ☐

3. When were you born? _____ (month) _____ (day) _____ (year)

4. What is your present marital status?

	Check one:
1. single	1. ☐
2. separated or divorced	2. ☐
3. widowed	3. ☐
4. married, less than 2 years	4. ☐
5. married, 2-4 years	5. ☐
6. married, 5-9 years	6. ☐
7. married, 10 years or more	7. ☐

5. How many persons--not including yourself--are dependent upon you for all or most of their support?

	Check one:
1. none	1. ☐
2. one	2. ☐
3. two or three	3. ☐
4. four or five	4. ☐
5. more than five	5. ☐

6. Is your husband or wife working at present? Check one:

1. I am not married	1. ☐
2. spouse not employed	2. ☐
3. spouse employed part time	3. ☐
4. spouse employed full time	4. ☐

7. Write in the appropriate number for each of the following questions. Write in number :

1. Number of older brothers	1. ☐
2. Number of younger brothers	2. ☐
3. Number of older sisters	3. ☐
4. Number of younger sisters	4. ☐

8. Which one of the following occupational groups comes closest to describing the work of your father? Check one:

01.	Farm or ranch worker	01. ☐
02.	Workman or laborer--such as factory or mine worker, fisherman, filling station attendant, longshoreman	02. ☐
03.	Farm or ranch foreman	03. ☐
04.	Private household worker--such as servant, butler	04. ☐
05.	Protective worker--such as policeman, detective, sheriff, fireman	05. ☐
06.	Service worker--such as barber, beautician, waiter	06. ☐
07.	Semi-skilled worker--such as factory machine operator, bus or cab driver, meat cutter	07. ☐
08.	Clerical worker--such as bank teller, bookkeeper, sales clerk, office clerk, mail carrier, messenger	08. ☐
09.	Skilled worker or foreman--such as baker, carpenter, electrician, enlisted man in the armed forces, mechanic, plumber, plasterer, tailor, foreman in a factory or mine (but not on a farm)	09. ☐
10.	Salesman--such as real estate or insurance salesman, factory representative	10. ☐
11.	Technical--such as draftsman, surveyor, medical or dental technician	11. ☐
12.	Farm or ranch owner and/or manager	12. ☐
13.	Manager--such as sales manager, store manager, office manager, business manager, factory supervisor	13. ☐
14.	Proprietor or owner--such as owner of a small business or store, wholesaler, retailer, contractor, restaurant owner	14. ☐
15.	Official--such as manufacturer, officer in a large company, banker, government official or inspector	15. ☐
16.	Professional--such as actor, accountant, artist, teacher, clergyman, dentist, engineer, lawyer, librarian, scientist	16. ☐
17.	Other--(specify):_____	17. ☐

9. Which one of the following comes closest to describing the work of your mother?

Check one:

01.	She did not work steadily outside of the home	01. ☐
02.	Farm or ranch worker	02. ☐
03.	Worker or laborer--such as charwoman, laundry worker	03. ☐
04.	Private household worker--such as housekeeper, maid, laundress	04. ☐
05.	Protective worker--such as policewoman	05. ☐
06.	Service worker--such as beautician, waitress	06. ☐
07.	Semi-skilled worker--such as factory machine operator, cab driver	07. ☐
08.	Clerical worker--such as bookkeeper, secretary, typist, sales clerk, store clerk	08. ☐
09.	Skilled worker or forewoman--such as baker, inspector	09. ☐
10.	Sales--such as real estate, life insurance	10. ☐
11.	Technical--such as draftsman, medical or dental technician	11. ☐
12.	Farm or ranch owner and/or manager	12. ☐
13.	Manager--such as sales manager, store manager, office manager, business manager, factory supervisor	13. ☐
14.	Proprietor or owner--such as owner of a small business, wholesaler, retailer, restaurant owner	14. ☐
15.	Official--such as manufacturer, officer in a large company, banker, government official or inspector	15. ☐
16.	Professional--such as actress, accountant, artist, dentist, physician, engineer, teacher, lawyer, librarian, scientist	16. ☐
17.	Other--(specify): _____	17. ☐

10. The place in which you spent the most time up to the age of 15 was a — Check one:

1. Farm, or village with less than 2500 people (not the suburban area of a city) — 1. ☐
2. Small city or town with 2500 to 25,000 people (not the suburban area of a city) — 2. ☐
3. A medium sized city with 25,000 to 100,000 people — 3. ☐
4. A large city with 100,000 or more people — 4. ☐
5. A suburban area town or village around a city — 5. ☐

11. How close to your place of birth is the hospital where you are now working? — Check one:

1. Less than 50 miles away — 1. ☐
2. 50-149 miles away — 2. ☐
3. 150-499 miles away — 3. ☐
4. 500 miles away, or further — 4. ☐

12. How often have you changed residences in the past five years? — Check one:

1. not at all — 1. ☐
2. once — 2. ☐
3. twice — 3. ☐
4. three times — 4. ☐
5. four or more times — 5. ☐

B. MILITARY SERVICE

13. For how long were you on active duty in the armed forces? Check one:

1. have never been in the armed forces — 1. ☐
2. less than 1 year — 2. ☐
3. 1-2 years — 3. ☐
4. 3-4 years — 4. ☐
5. 5-8 years — 5. ☐
6. 9-19 years — 6. ☐
7. 20 years or longer — 7. ☐

C. EDUCATIONAL BACKGROUND

14. For each of the following members of your family and yourself, please use the following code to indicate educational level reached:

1. eighth grade or less
2. attended high school but did not graduate
3. graduated from high school
4. attended college 2 years or less
5. completed a 2-year terminal college program
6. attended college more than 2 years
7. graduated from a 4-year college program
8. advanced study beyond college

	Write in number:
a. yourself	a. ☐
b. father	b. ☐
c. mother	c. ☐
d. spouse (write in "0" if you are not married)	d. ☐

15. Approximate size of your high school graduating class:

	Check one:
1. 1-24	1. ☐
2. 25-99	2. ☐
3. 100-399	3. ☐
4. 400 or more	4. ☐
5. not applicable	5. ☐

16. What was your approximate standing in your high school graduating class?

	Check one:
1. in the top 25%	1. ☐
2. in the second 25%	2. ☐
3. in the third 25%	3. ☐
4. in the bottom 25%	4. ☐
5. did not graduate	5. ☐

2

17. In what part of the country did you live most of the time while you were attending high school?

	Check one:
Washington, D. C. metropolitan area	01. ☐
New England (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut)	02. ☐
Middle Atlantic I (New York, New Jersey)	03. ☐
Middle Atlantic II (Pennsylvania, Delaware, Maryland, Virginia, West Virginia)	04. ☐
South Atlantic and East South Central (North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi)	05. ☐
East North Central (Ohio, Indiana, Illinois, Michigan, Wisconsin, Kentucky)	06. ☐
West North Central (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)	07. ☐
West South Central (Arkansas, Louisiana, Oklahoma, Texas)	08. ☐
Mountain and North Pacific (Montana, Idaho, Washington, Oregon, Alaska)	09. ☐
South West (New Mexico, Arizona, Utah, Wyoming, Colorado)	10. ☐
Pacific (California, Nevada, Hawaii)	11. ☐
Attended high school, but not in this country	12. ☐

18. What was your major area of study in high school?

	Check one:
1. academic or college preparatory	1. ☐
2. general	2. ☐
3. business or commercial	3. ☐
4. agriculture	4. ☐
5. home economics	5. ☐
6. vocational or industrial arts	6. ☐

19. Where did you receive most of your formal medical laboratory training?

Check one:

1. at an accredited school for technicians — 1. ☐
2. in military service — 2. ☐
3. at a government hospital — 3. ☐
4. at a civilian hospital — 4. ☐
5. at a civilian laboratory — 5. ☐
6. other (specify) _____ _____ — 6. ☐

20. How long was the training course?

Check one:

1. less than 12 months — 1. ☐
2. 12-17 months — 2. ☐
3. 18-23 months — 3. ☐
4. 24 months or longer — 4. ☐

21. In what area of the country did you receive your medical laboratory training?

Check one:

Washington, D.C. metropolitan area — 01. ☐

New England (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut) — 02. ☐

Middle Atlantic I (New York, New Jersey) — 03. ☐

Middle Atlantic II (Pennsylvania, Delaware, Maryland, Virginia, West Virginia) — 04. ☐

South Atlantic and East South Central (North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi) — 05. ☐

East North Central (Ohio, Indiana, Illinois, Michigan, Wisconsin, Kentucky) — 06. ☐

West North Central (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas) — 07. ☐

West South Central (Arkansas, Louisiana, Oklahoma, Texas) — 08. ☐

(continued on next page)

Check one:

Mountain and North Pacific (Montana, Idaho, Washington, Oregon, Alaska) 09. ☐

South West (New Mexico, Arizona, Utah, Wyoming, Colorado) 10. ☐

Pacific (California, Nevada, Hawaii) 11. ☐

Received medical laboratory training but not in this country 12. ☐

22. What was your major field of study in college? Check one:

1. did not attend college 1. ☐
2. mathematics, physics, chemistry or engineering 2. ☐
3. biology, physiology, or bacteriology 3. ☐
4. psychology, education, or sociology 4. ☐
5. business or commerce 5. ☐
6. history or political science 6. ☐
7. foreign languages 7. ☐
8. English or journalism 8. ☐
9. some field not mentioned (specify) _____ 9. ☐

23. In what area of the country is the college you attended? If you attended more than one, check as many as apply): Check as many as apply:

Washington, D.C. metropolitan area 01. ☐

New England (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut) 02. ☐

Middle Atlantic I (New York, New Jersey) 03. ☐

Middle Atlantic II (Pensylvania, Delaware, Maryland, Virginia, West Virginia) 04. ☐

South Atlantic and East South Central (North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi) 05. ☐

East North Central (Ohio, Indiana, Illinois, Michigan, Wisconsin, Kentucky) 06. ☐

(continued on next page)

West North Central (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas) 07. ☐

West South Central (Arkansas, Louisiana, Oklahoma, Texas) 08. ☐

Mountain and North Pacific (Montana, Idaho, Washington, Oregon, Alaska) 09. ☐

South West (New Mexico, Arizona, Utah, Wyoming, Colorado) 10. ☐

Pacific (California, Nevada, Hawaii) 11. ☐

Did not attend college 12. ☐

24. Name and location of each college attended: _____

_____

25. Since September 1966, have you at any time been enrolled in a formal program of education? Check one:

1. no 1. ☐

2. yes 2. ☐

If yes:

List the courses you have taken or are taking in medical technology: _____

_____

_____

not in medical technology: _____

_____

	Write in number
a. total semester-hours for the med-tech courses	a. ☐
b. total semester-hours for the non med-tech courses	b. ☐

26. Since September 1966, how many hours of training per month have you received, on the average, in each of the following activities? (Do not include the formal courses listed in question 25.)

Write in number of hours:

1. seminars, lectures, other instructional meetings — 1. ☐
2. textbooks, journals, manuals, other reference materials — 2. ☐
3. on-the-job training on unfamiliar laboratory tests and procedures — 3. ☐
4. other (specify)._____ — 4. ☐

27. Since September, 1966, how many visits (arranged for the purpose of instruction in new procedures, new equipment, and so on) have you made to:

Write in number:

1. laboratories in other hospitals — 1. ☐
2. colleges or universities (do not include formal instruction described in question 25) — 2. ☐
3. commercial laboratories and instrument manufacturers — 3. ☐
4. other (specify):_____ — 4. ☐

D. EXPERIENCE RECORD

28. Which of the following types of work have you done for pay?

Check as many as apply:

01. Farm or ranch worker — 01. ☐

02. Worker or laborer--such as factory worker, fisherman, filling station attendant, charwoman, laundry worker — 02. ☐

03. Farm or ranch foreman — 03. ☐

04. Private household worker--such as servant, butler, housekeeper, maid — 04. ☐

05. Protective worker--such as policeman or policewoman, sheriff, fireman — 05. ☐

06. Service worker--such as barber, beautician, waiter or waitress — 06. ☐

07. Semi-skilled worker--such as factory machine operator, bus or cab driver, meat cutter — 07. ☐

08. Clerical worker--such as bank teller, bookkeeper, secretary, typist, sales clerk, office clerk, mail carrier — 08. ☐

09. Skilled worker or foreman--such as baker, carpenter, electrician, enlisted man in the armed forces, mechanic, plumber, plasterer, tailor, foreman in a factory or mine (but not on a farm) — 09. ☐

10. Salesman or saleswoman--such as real estate, insurance, factory representative — 10. ☐

11. Technical--such as draftsman, surveyor, dental technician (do not include medical technician) — 11. ☐

12. Farm or ranch owner and/or manager — 12. ☐

13. Manager--such as sales manager, store manager, business manager, factory supervisor — 13. ☐

14. Proprietor or owner--such as owner of a small business or store, wholesaler, retailer, contractor, restaurant owner — 14. ☐

15. Official--such as manufacturer, officer in a large company, banker, government official or inspector — 15. ☐

(continued on next page)

16. Professional--such as actor or actress, accountant, artist, teacher, clergyman, dentist, physician, engineer, lawyer, librarian, scientist 16. ☐

17. Other--(specify): _____ 17. ☐

29. What was your full-time job just prior to going into medical laboratory work? What did you do on this job? Please be specific.

_____

_____

_____

30. Have you ever held a job where the things you learned have been helpful to you in your present work? (Some examples might be: a nursing assistant or licensed practical nurse, a physical science aide, a pharmacy assistant, a mortician's assistant, a clerical worker.)

Check one:

1. no 1. ☐

2. yes 2. ☐

If "yes," please list each such job, and how it helped:

_____

_____

_____

_____

31. How did you get your first job in a medical laboratory? Check one:

1. through a friend or relative 1. ☐
2. through the school attended 2. ☐
3. through the employment agency 3. ☐
4. by answering an advertisement 4. ☐
5. through a federal civil service register 5. ☐
6. other (Please specify) _____ 6. ☐

_____

32. Why did you choose a career in medical laboratory work?

Check as many as apply:

1. general interest in the medical field — 1. ☐
2. influence of parents — 2. ☐
3. influence of friends or relatives other than parents — 3. ☐
4. expected income — 4. ☐
5. job availability — 5. ☐
6. training opportunities--in military schools, scholarships, apprenticeships, etc. — 6. ☐
7. influence of counselors — 7. ☐
8. desire to aid humanity — 8. ☐
9. a person you admired — 9. ☐
10. "just fell into it" — 10. ☐
11. other (specify): _____ — 11. ☐

_____

33. How long have you been employed at this station?

Check one:

1. less than 6 months — 1. ☐
2. 6-11 months — 2. ☐
3. 1-3 years — 3. ☐
4. 4-7 years — 4. ☐
5. 8 years or longer — 5. ☐

34. How many times have you changed jobs in the last five years?

Check one:

1. one — 1. ☐
2. two — 2. ☐
3. three — 3. ☐
4. four — 4. ☐
5. five — 5. ☐
6. six or more — 6. ☐

35. Why did you leave your last full-time job? Check one:

1. dissatisfied with pay or working conditions 1. ☐
2. laid off because of reduction in work force 2. ☐
3. discharged for other reasons 3. ☐
4. little chance for advancement 4. ☐
5. important personal reasons--such as, moving to another part of the country 5. ☐
6. illness 6. ☐
7. something else, or have never had another full-time job 7. ☐

36. During the past full year, for how many weeks have you worked in each of the following specialties? (If you have spent no time in a particular specialty, write "0" in the block next to that specialty.) Write in number of weeks spent:

1. bacteriology 1. ☐
2. histopathology 2. ☐
3. hematology 3. ☐
4. chemistry 4. ☐
5. blood bank 5. ☐
6. mycology 6. ☐
7. cytology 7. ☐
8. serology 8. ☐
9. other laboratory specialty (specify)_____ 9. ☐

37. During the last year, how many accidents have you had in the laboratory that caused you to lose at least half a day's time from work? Check one:

1. none 1. ☐
2. one 2. ☐
3. two 3. ☐
4. three 4. ☐
5. four or more 5. ☐

38. Write in the number of years you have spent in the U.S. Civil Service in each GS grade, to the nearest year. If you have NEVER served in a grade, be sure to mark "0" in the box next to that grade

Write in number:

01. GS-1 — 01. ☐
02. GS-2 — 02. ☐
03. GS-3 — 03. ☐
04. GS-4 — 04. ☐
05. GS-5 — 05. ☐
06. GS-6 — 06. ☐
07. GS-7 — 07. ☐
08. GS-8 — 08. ☐
09. GS-9 — 09. ☐
10. GS-10 and up — 10. ☐

39. How many years have you been in the U.S. Civil Service as a medical technician?

Write in number: ☐

40. Have you ever taken a written U.S. Civil Service test for medical laboratory workers?

Check one:

1. no — 1. ☐
2. yes — 2. ☐

E. SPECIAL SKILLS AND INTERESTS

41. Each of the following specialities is preceded by an identifying number.

1. bacteriology
2. histopathology
3. hematology
4. chemistry
5. blood bank
6. mycology
7. cytology
8. serology
9. other (specify):_____

Please use these identifying numbers to answer the following questions:

Write one number in each box:

a. What is your area of greatest competence? a. ☐

b. What is your area of second-greatest competence? b. ☐

c. What is your area of third-greatest competence? c. ☐

d. What is the area in which you are now working? d. ☐

42. In which of the following specialties have you had at least three full months of technical experience, at any time?

Check as many as apply:

1. bacteriology 1. ☐
2. histopathology 2. ☐
3. hematology 3. ☐
4. chemistry 4. ☐
5. blood bank 5 ☐
6. mycology 6. ☐
7. cytology 7. ☐
8. serology 8. ☐
9. other (specify): _____ 9. ☐

43. How many years have you spent in federal government service (both military and civilian)?

Check one:

1. less than 2 years ☐ 1.
2. 2-3 years ☐ 2.
3. 4-7 years ☐ 3.
4. 8-11 years ☐ 4.
5. 12-15 years ☐ 5.
6. 16-19 years ☐ 6.
7. 20 years or longer ☐ 7.

44. How much total experience have you had as a medical technician?

Check one:

1. less than 2 years ☐ 1.
2. 2-3 years ☐ 2.
3. 4-7 years ☐ 3.
4. 8-11 years ☐ 4.
5. 12-15 years ☐ 5.
6. 16-19 years ☐ 6.
7. 20 years or longer ☐ 7.

45. Which of the following do you feel is the one <u>most</u> important thing about your job?

Check one:

1. starting salary ☐ 1.
2. future salary ☐ 2.
3. job security ☐ 3.
4. good supervisors ☐ 4.
5. good fellow workers ☐ 5.
6. working conditions ☐ 6.
7. opportunity for promotion ☐ 7.
8. good fringe benefits ☐ 8.
9. serving others ☐ 9.
10. kind of work ☐ 10.

No. _____

PERSONAL HISTORY QUESTIONNAIRE

Supplement 1. - Task Information

FORM A

GS Level _____

Title _____

VA Station _____

The questions in the following section are asked in order to find out what kinds of things you do as part of your job, and how often you do them.

1. Check the specialty or specialties in which you have worked for at least one full week during the past year.

	Check as many as apply:
1. bacteriology	1. ☐
2. histopathology	2. ☐
3. hematology	3. ☐
4. chemistry	4. ☐
5. blood bank	5. ☐
6. mycology	6. ☐
7. cytology	7. ☐
8. serology	8. ☐
9. other (specify): _____	9. ☐

2. Check the specialty or specialties in which you are now working. (I you are working in more than one specialty at this time, check as many as apply):

	Check as many as apply
1. bacteriology	1. ☐
2. histopathology	2. ☐
3. hematology	3. ☐
4. chemistry	4. ☐
5. blood bank	5. ☐
6. mycology	6. ☐
7. cytology	7. ☐
8. serology	8. ☐
9. other (specify): _____	9. ☐

The rest of this section consists of a list of medical laboratory tasks. For each task in the list, please check the box which best shows how often you performed that task during the past year. If, during the year, you have rotated or been transferred from one section of the lab to another, check the frequency which describes how often you have performed each task when assigned to the section where it is more frequently done.

		Check one box for each task			
		Often	Some-times	Seldom	Never
3. Perform biochemical procedures for liver function tests	3.	☐	☐	☐	☐
4. Operate spectro-photometer	4.	☐	☐	☐	☐
5. Perform biochemical procedures for total protein and A/G ratio	5.	☐	☐	☐	☐
6. Utilize methods for colori-metric procedure	6.	☐	☐	☐	☐
7. Perform biochemical procedures for carbon dioxide determinations	7.	☐	☐	☐	☐

		Check one box for each task			
		Often	Some-times	Seldom	Never
8. Perform biochemical procedures for chlorides test	8.	☐	☐	☐	☐
9. Utilize methods for electrolyte determinations	9.	☐	☐	☐	☐
10. Perform biochemical procedures for carbohydrates tolerance tests	10.	☐	☐	☐	☐
11. Clean area and equipment aseptically	11.	☐	☐	☐	☐
12. Prepare culture media	12.	☐	☐	☐	☐
13. Identify and classify pathogenic bacteria	13.	☐	☐	☐	☐
14. Stain bacteriological smears	14.	☐	☐	☐	☐
15. Examine specimens microscopically	15.	☐	☐	☐	☐
16. Identify protozoans, cestodes, nematodes, or trematodes	16.	☐	☐	☐	☐
17. Perform concentration and flotation techniques	17.	☐	☐	☐	☐
18. Log incoming and outgoing specimens	18.	☐	☐	☐	☐
19. Collect fecal or urine specimens directly from patients	19.	☐	☐	☐	☐
20. Stain parasitological smears	20.	☐	☐	☐	☐
21. Prepare solutions and standards	21.	☐	☐	☐	☐
22. Use microtome	22.	☐	☐	☐	☐
23. Mount tissue section in preparation for microscopic study	23.	☐	☐	☐	☐
24. Stain specimens for microscopic study	24.	☐	☐	☐	☐
25. Prepare tissue for fixation, dehydration, and infiltration of paraffin	25.	☐	☐	☐	☐

		Check one box for each task			
		Often	Some-times	Seldom	Never
26.	Prepare special stains	☐	☐	☐	☐
27.	Use autotechnicon	☐	☐	☐	☐
28.	Decalcify specimens of teeth and bone	☐	☐	☐	☐
29.	Submit tissue specimens to AFIP or histopathology centers	☐	☐	☐	☐
30.	Use microtome knife sharpener	☐	☐	☐	☐
31.	Prepare specimens for shipment	☐	☐	☐	☐
32.	Prepare reagents	☐	☐	☐	☐
33.	Prepare frozen sections of tissue	☐	☐	☐	☐
34.	Perform urinalyses for lead tests	☐	☐	☐	☐
35.	Prepare autogenous vaccines	☐	☐	☐	☐
36.	Operate spectro-fluorometer	☐	☐	☐	☐
37.	Perform biochemical procedures for serum magnesium tests	☐	☐	☐	☐
38.	Count fluid specimens	☐	☐	☐	☐
39.	Use crystal and liquid scintillation detectors	☐	☐	☐	☐
40.	Use geiger-mueller equipment	☐	☐	☐	☐
41.	Perform blood count	☐	☐	☐	☐
42.	Prepare blood smears	☐	☐	☐	☐
43.	Collect blood specimens directly from patients	☐	☐	☐	☐
44.	Perform hematology procedures for erythrocyte sedimentation rate	☐	☐	☐	☐
45.	Perform hematology procedures for coagulation times by capillary method	☐	☐	☐	☐

			Check one box for each task			
			Often	Some-times	Seldom	Never
46.	Perform hematology procedures for erythrocyte indices	46.	☐	☐	☐	☐
47.	Perform hematology procedures for cerebrospinal fluid count	47.	☐	☐	☐	☐
48.	Prepare and process specimens	48.	☐	☐	☐	☐
49.	Crossmatch blood	49.	☐	☐	☐	☐
50.	Test blood for RHO or DU factors	50.	☐	☐	☐	☐
51.	Maintain files of blood banking forms	51.	☐	☐	☐	☐
52.	Perform serological procedures for heterophile presumptive and differential antibody test	52.	☐	☐	☐	☐
53.	Dispose of blood after time limit	53.	☐	☐	☐	☐
54.	Perform serological procedures for cardiclipin microfloccula-tion	54.	☐	☐	☐	☐
55.	Wash glassware	55.	☐	☐	☐	☐
56.	Keep logs and/or other hand-written records	56.	☐	☐	☐	☐
57.	Examine urine specimens micro-scopically	57	☐	☐	☐	☐
58.	Perform urinalyses for specific gravity tests	58.	☐	☐	☐	☐